

**Improvements to Trails and Overlooks  
At Great Falls Park, Virginia**

**George Washington Memorial Parkway  
National Park Service**

Environmental Assessment

April 2001

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## Summary

Great Falls Park encompasses approximately 800 acres of primarily deciduous forest adjacent to the Potomac River in northeast Fairfax County, Virginia. The National Park Service (NPS) administers the park as a unit of the George Washington Memorial Parkway (GWMP). George Washington Memorial Parkway's enabling legislation provided for the "...protection and preservation of the natural scenery of the Gorge and the Great Falls of the Potomac, (and) the preservation of the historic Patowmack Canal...". The park offers visitors spectacular views of the Potomac River cascading 76-feet over jagged rocks through a series of cataracts and then surging through the narrow Mather Gorge. A wide variety of outdoor recreational opportunities are available in a setting of outstanding natural and cultural resources. The preserved ruins of the Patowmack Canal are the park's primary cultural resource - a physical reminder of George Washington's efforts to make the river a navigable waterway. The park's location also holds great geological value and populations of rare plant species occupy the unique environment along the Potomac's rocky shore. Local residents and tourists from around the world are attracted to the park to enjoy the views, take walks, and picnic with family and friends. However, the river's rocky shoreline and dangerous waters also present significant hazards that require caution and the exercise of good judgement in order to be safely enjoyed.

The record of serious visitor injuries and drownings, as well as obvious impacts on park resources, indicates a need to better manage visitor use in order to alleviate safety concerns and enhance protection of the park's resources and scenic qualities. Improvements to the park's system of trails and overlooks would address critical visitor safety and resource protection issues in the most heavily used part of the park. Two existing overlooks provide scenic views below the falls. The overlooks are in deteriorating condition, and their concrete slab construction and steel handrails are visually incompatible with the surroundings. A short trail from the visitor center leads to an undeveloped area adjacent to and above the falls. This area provides some of the park's most spectacular and exciting viewing points. Unfortunately, numerous social trails have resulted from some visitors departing the designated trail system, inadvertently damaging stonework of the Patowmack Canal, and rare plants and other vegetation. Visitors also often scramble over the rocks and cliffs to reach certain vantage points. Their rock-hopping and wading along the river's edge at times places them in dangerous situations.

The intent of the project is to improve visitor use management by providing desirable opportunities and facilities that positively encourage visitors to stay on established trails and overlooks. The proposals call for the design and construction of trails, boardwalks, overlooks, and associated improvements such as signs, wayside exhibits, and bulletin boards. The following alternatives have been developed for evaluation:

*Alternative A [Maintain Current Management and Existing Conditions (No Action)]* - No action (other than routine and cyclic maintenance) would be taken to improve the system of overlooks and trails. The two existing overlooks would be retained in their current condition.

*Alternative B [Improve Overlooks 1 and 2, and Fisherman's Eddy Access]* - This alternative would involve rehabilitation of the existing Overlooks 1 and 2 and their approach walkways. Both overlooks would be made accessible for disabled visitors. The overlooks would be reconstructed as a combination of decks and concrete slabs, with new stone wall and rail edges, and upgraded to fit more naturally into the surroundings. Access to the area behind the visitor center adjacent to the falls would be discouraged by use of fences, and no overlooks or trails would be developed in that area. The river area between Overlooks 1 and 2 (also called Fisherman's Eddy) that is used by kayakers, rafters, and anglers, would be provided with riprap or a rock retaining structure to stabilize the shore. The area above would be partially filled, graded, shaped, and revegetated to a natural appearance. However, further studies would be required to address engineering needs, resource protection, and safety concerns before project improvements would be implemented in this area.

*Alternative C [Improve Overlooks 1 and 2, Fisherman's Eddy Access, and Construct Shade Tree-Jetty Loop Trail and Overlooks]* – Under this alternative (if engineering studies show that safe access is feasible) improvements would be made to Overlooks 1 and 2 as described in Alternative B, along with stabilization/revegetation of the area between the overlooks including the Fisherman's Eddy access. In addition, a loop trail/boardwalk would be constructed through the area between the visitor center and the river. Trailhead kiosks would orient visitors, and impart interpretive and safety information. New overlooks in the Shade Tree/Jetty area would provide scenic views of the river and falls, and benches would also be added. The trail would include sections of elevated walkway to meet accessibility requirements and to avoid sensitive resource areas. Handrails, areas of stone wall, fencing, signs, and other landscaping elements would help to clearly define the trail for visitors and discourage off-trail use.

The reconstruction of Overlooks 1 and 2 and their approach walkways would improve the visitor experience at these very popular facilities. The overlooks would fit more naturally with the environment, and the appearance of the park would be improved. The new facilities would allow access for disabled individuals to view the falls.

The construction of the proposed loop trail/boardwalk and overlook system in the area behind the visitor center would provide convenient and safe access for viewing the river. These facilities would help disperse visitors and would assist in accommodating future visitation increases. Safety in the area

behind the visitor center would be greatly improved by managing access and providing increased visitor education about river hazards. New signs and railings would encourage visitors to remain on the loop and overlooks rather than wandering along the rocks. Additional signs and displays would also improve interpretation of the park's resources along the loop trail. Managed trail use and visitor access would help to protect historic and natural resources near the visitor center.

Alternative C1 (preferred) [Improve Overlooks 1 and 2, and Construct Shade Tree-Jetty Loop Trail and Overlooks] – The actions proposed under this alternative are generally the same as those of Alternative C. Alternative C1, however, would defer measures to stabilize and restore the area between Overlooks 1 and 2 and the Fisherman's Eddy access, pending future investigations to determine whether such improvements are feasible and sustainable. As described for Alternatives B and C, improvements would be made to Overlooks 1 and 2. In addition, a loop trail/boardwalk would be constructed through the area between the visitor center and the river. Trailhead kiosks would orient visitors, and impart interpretive and safety information. New overlooks in the Shade Tree/Jetty area would provide scenic views of the river and falls, and benches would also be added. The trail would include sections of elevated walkway to meet accessibility requirements and to avoid sensitive resource areas. Handrails, areas of stone wall, fencing, signs, and other landscaping elements would help to clearly define the trail for visitors and discourage off-trail use.

The reconstruction of Overlooks 1 & 2 and their approach walkways would improve the visitor experience at these very popular facilities. The overlooks would fit more naturally into their environment, and the appearance of the park would be improved. The new facilities would allow access for disabled individuals to view the falls.

The construction of the proposed loop trail/boardwalk overlook system in the area behind the visitor center would provide convenient and safe access for viewing the river. These facilities would help disperse visitors and would assist in accommodating future visitation increases. Safety in the area behind the visitor center would be greatly improved by managing access and providing increased visitor education about river hazards. New signs and railings would encourage visitors to remain on the loop and overlooks rather than wander along the rocks. Additional signs and displays would also improve interpretation of the park's resources along the loop trail. Managed trail use and visitor access would help to protect historic and natural resources near the visitor center.

## Section I. Purpose and Need for Action

### Background

Great Falls Park is administered by the National Park Service (NPS) as a unit of the George Washington Memorial Parkway (GWMP) and is located in northeastern Fairfax County, Virginia (See Figure 1, Location Map). The park is bounded on the east by the Potomac River, while much of the remainder of the park is surrounded by low density residential development. Route 193 (Georgetown Pike) defines much of the southwest edge of the park, while Old Dominion Drive, River Bend Road, and private lands are located adjacent to the west and north boundaries. Approximately 0.2 mile of the north edge of the park is adjacent to the southern boundary of Fairfax County's River Bend Park.

The 1930 enabling legislation establishing GWMP included language providing for the "...protection and preservation of the natural scenery of the Gorge and the Great Falls of the Potomac, (and) the preservation of the historic Patowmack Canal...". Today, the site encompasses approximately 800 acres of primarily deciduous forest adjacent to the Potomac River on the Virginia side. The State of Maryland maintains jurisdiction over the river itself, while the Chesapeake and Ohio Canal National Historic Park, a separate unit of the NPS, manages the land on the Maryland side of the river.

Many generations of visitors have enjoyed the spectacle of the river cascading 76-feet over jagged rocks through a series of cataracts and then surging through the narrow Mather Gorge. Today, visitors to the park enjoy a wide variety of outdoor recreational opportunities in a setting of outstanding natural and cultural resources. The preserved ruins of the Patowmack Canal are the park's primary cultural resource, evidence of George Washington's efforts to make the river navigable and bind the nation together in a network of trade and mutual interest. The park's significant geological resources include vast areas of exposed bedrock that identifies the East Coast fall line. A wide diversity of plants and animals are also found in the park; populations of state listed rare or uncommon plants occupy the unique environment along the rocky shore of the river. Local residents and visitors from around the world are attracted to the park for sightseeing, hiking, birdwatching, picnicking, and other recreational pursuits.

### Need for the Action

- *Area is hazardous:* While the park contains great natural beauty and outstanding opportunities for recreation and education, the rocky shoreline and dangerous waters of the Potomac River also present significant hazards that require caution and the exercise of good judgement in order to be safely enjoyed. The hazardous cliffs and shoreline above the turbulent



and fast moving waters are easily accessible by a diverse urban population, many of whom many not fully appreciate the need for caution or the consequences of a slip or fall from the cliffs into the river. In addition, preservation of the park's natural and cultural resources requires sound visitor use management strategies to protect these resources from the impacts of heavy visitation.

- *Area is unsightly and vegetation is heavily impacted:* Currently, two developed overlooks provide scenic views from vantage points below the falls. Constructed several decades ago, the overlooks are in deteriorating condition and are aesthetically incompatible with the natural surroundings. Both are of concrete slab construction with steel handrails on three sides. The approach paths and adjacent areas are eroded, compacted, and in some places barren of vegetation, the result of both flood damage and the effects of visitor use. The overlooks present a stark contrast to new aesthetically pleasing overlooks built for the C&O Canal National Historic Park on the opposite side of the Potomac. Visitors to either park can readily perceive the discrepancy in overlook appearance as they gaze across the river.
- *Area is unsafe for visitor use:* A short trail from the visitor center leads to an undeveloped area immediately adjacent to and above the falls (See Figure 2, Existing Conditions). This area (variously referred to by landmarks known informally as the “Jetty”, “Shade Tree”, and the “Spout”) provides some of the most spectacular vantage points within the park. The area draws a significant amount of visitor use and is crossed by numerous social trails. A developed overlook was formerly located here, however it was destroyed in the flood that followed Hurricane Agnes in 1972. Visitors are attracted to the area because of its proximity to the developed area and because here they can most closely experience the wildness of the cascading river with its thunder and spray. Many visitors scramble over the cliffs, and venture along the rocky shoreline and through the woods to reach other scenic vantage points. It is common to see visitors rock-hopping along the water's edge where there is no margin for error, or even wading in the river although that activity is prohibited.

The NPS provides safety information in the form of signs, brochures, handouts, and bulletin boards. In addition, park rangers include a safety message in all interpretive programs, and proactively address visitor safety issues through roving patrols intended to educate visitors about potential hazards. While the vast majority of visitors safely enjoy the area, serious incidents have occurred, and drownings have resulted when visitors fell or slipped into the river and were swept over the falls.

- *Resources are being impacted:* As previously noted, visitor use patterns are also resulting in significant damage to both natural and cultural resources. As a result of damage from the 1996

floods, trails and walkways in the affected area became less clearly defined. Accordingly, many new social trails have developed and park visitors have inadvertently caused damage to the stonework of the Patowmack Canal when wandering through the area. Trampling has also damaged rare and uncommon plants, as well as other vegetation.

## **Project Purpose**

The purpose of this project is to make improvements to the park's system of trails and overlooks in order to address critical visitor safety, access, and resource protection issues in the most heavily used part of the park.

- *Improve Resource Protection:* Significant impacts on the park's natural and cultural resources indicate a need to better manage visitor use. By providing better management of the visitor experience, enhanced protection of the park's natural and cultural resources and scenic qualities can be realized.
- *Improve Visitor Safety and Access:* Greater opportunities would be provided for all visitors to access and safely enjoy the area. The project would reduce the potential for serious injury from visitors falling from the rocks and/or into the river.
- *Improve visual quality:* The designs for improvements would also add sustainable and visually attractive elements to the park's built environment that harmonize with the natural landscape when viewed from within the park, from the river, and from the Great Falls Park on the C&O Canal in Maryland.

## **Relationship to Other Park Plans/Projects**

Within the next year, the park plans to begin preparation of a Management Plan that will provide long-term comprehensive management strategies to address resource protection, visitor use, and other objectives for the entire site of Great Falls Park. Projects currently underway include archeological investigations of the Patowmack Canal and stabilization of the stone canal walls and locks.

Rehabilitation of the park entrance road will soon be underway. Both the C & O Canal and GWMP are participating in the Potomac Gorge Study with the Nature Conservancy and the NPS National Capital Region, to determine conservation strategies to protect the outstanding natural resources of the Potomac Gorge. This study will not be complete for another 2 to 3 years.

## **Impact Topics and Issues**

The following impact topics were selected for analysis to provide a basis for environmental discussions. Their inclusion was based on federal laws, regulations, and orders; NPS *Management Policies*; knowledge of limited or easily impacted resources; and issues identified during project scoping. Issues and concerns affecting this project were identified in discussions with park managers, and information gathered from other federal and state agencies.

**Visitor Use and Safety.** GWMP's enabling legislation directs the park to provide a variety of recreational opportunities for the Washington metropolitan area. Effective recreational use management also requires serious consideration of measures that promote visitor safety as well as resource protection. Visitor use and safety are therefore analyzed in this environmental assessment.

The existing trails to the overlooks also do not adequately meet accessibility standards. The design of trails and overlooks that more fully meet the accessibility requirements of the visiting public is therefore an important consideration. There should also be opportunities for visitors to receive educational material prior to venturing to the river's edge. New information/directional kiosks and trailhead wayside exhibits would be strategically located to address these needs, and to complement the existing trail and visitor circulation system.

**Natural Resources.** The 1969 National Environmental Policy Act (the overriding national charter for environmental protection) requires examination of the environmental impacts of federal actions on the components of affected ecosystems. NPS *Management Policies*, NPS-77 (Natural Resources Management Guidelines), and other NPS and park policies provide general direction for the protection of the park's naturally occurring plant and animal communities.

Particular sensitivity is required to protect or minimize potential project disturbances on populations of rare plant species. The park natural resource staff has updated the plant inventory and determined rare plant locations. The project must also consider protection of the plants from visitor use patterns.

The project should also be consistent with GWMP's park-wide natural resource management goals, which include:

- To manage in cooperation with other agencies, the shores and tributaries of the Potomac River in such a way as to preserve water quality, reduce erosion and sedimentation, protect native species, and provide for recreation;
- To sustain or restore native biotic communities to as near a natural condition as possible,

removing the influences of modern development from primarily natural zones, including: the management or control of exotic species, maintenance of natural succession where possible, and the use of native and historically accurate materials everywhere;

- To protect populations and habitats of Federal and/or State listed rare plant and animal species by developing and implementing land management programs that ensure their survival.

The Potomac Gorge Study will not be completed in time for inclusion with this environmental assessment. Resource protection agencies, the Nature Conservancy, and other appropriate organizations will be consulted as this project progresses to ensure that issues regarding resource protection are adequately considered and addressed.

***Cultural Resources.*** The National Historic Preservation Act of 1966 (as amended), the National Environmental Policy Act of 1969 (NEPA), NPS Management Policies and DO-28 (NPS Cultural Resource Management Guideline) require the NPS to consider the effects of its actions on cultural resources.

The principal historic resource in the project area is the Patowmack Canal, listed in the National Register of Historic Places and further recognized for exceptional significance as a National Historic Landmark. Providing the Canal the high level of protection it merits under cultural resource management policies, while accommodating recreational use and access through the area, is an issue addressed by this environmental assessment.

Development of social trails and other visitor activities are adversely affecting other cultural resources, such as the remains of the historic gristmill adjacent to the canal. The area between Overlooks 1 and 2 contains the historic foundry that needs to be protected and interpreted. This site is adjacent to the Fisherman's Eddy kayak launch area, and foot traffic needs to be controlled to protect the foundry. Shore erosion is also threatening this historic resource.

***Park Operations and Facilities.*** Park law enforcement and rescue personnel are frequently called upon to respond to emergency situations and potential visitor use conflicts. The park is also a partner to a multi-agency agreement regarding rescue and emergency response. Project undertakings are intended to improve visitor use management, and therefore have a bearing on these aspects of park operations.

Additional administrative and maintenance issues for this project concern the costs of constructing and designing new facilities. In particular, the sustainability of new trails, walkways, and overlooks within

an area subject to periodic flooding presents a number of design and construction challenges. Materials and construction techniques would be selected based on their ability to best withstand the effects of high water and impacts by floating debris. To avoid excessive replacement of damaged resources, some materials would be removable for temporary storage during floods. Removable components (e.g. handrails, etc.) would result in more sustainable facilities, but would also require commitments of park staff labor to remove when flooding is expected, and likewise to replace after waters have receded.

### **Issues/Impact Topics Dismissed from Further Analysis**

***Floodplains.*** Executive Order 11988 (“Floodplain Management”) requires an examination of the potential risks and impacts of constructing facilities within floodplains. Additional guidance is provided in NPS Management Policies (2001), DO-12 (NEPA Guideline, 2001), and the NPS Floodplain Management Guideline (1993). In accordance with the NPS Floodplain Management Guideline, the proposed project undertakings are considered “excepted actions” to the requirements otherwise mandated for development within floodplains. In particular, construction of “picnic facilities, scenic overlooks, foot trails, and associated day-time parking facilities in non-high hazard areas” are considered excepted actions. Further operational issues not addressed in this environmental assessment are management of flood viewing, and phased shutdown and evacuation of the park during flood events. Proposed project development would be compatible with any operational flood planning.

***Wetlands.*** Executive Order 11990 (“Protection of Wetlands”) requires that wetlands be protected from project undertakings. Further guidance is provided in NPS Management Policies (2001) and DO-12 (NEPA Guideline, 2001). Although wetlands are present in the park, no jurisdictional wetlands would be disturbed as a result of project alternatives. Wetlands were therefore dismissed as an impact topic in this document.

***Environmental Justice.*** Executive Order 12898 (“General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”) requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects resulting from their programs and policies on minority and low-income populations and communities. None of the project alternatives would have health or environmental effects on minority or low-income populations or communities as defined in the Environmental Protection Agency’s Draft Environmental Justice Guidance (1996). Environmental Justice was therefore dismissed as an impact topic in this document.

***Prime and Unique Farmlands.*** In August, 1980, the Council on Environmental Quality (CEQ) directed that federal agencies assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture's Natural Resource Conservation Service as prime or unique. Prime or unique farmland is defined as soil which particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. There are no prime or unique farmlands associated with the project area. Therefore, prime and unique farmlands were dismissed as an impact topic in this document.

***Socioeconomic Values.*** Socioeconomic values consist of local and regional businesses and residents, and the local and regional economy. Within the project area, the park is bordered on the west primarily by low-density residential development and private lands. Should any of the action alternatives be implemented, some local and regional businesses and individuals would receive short-term economic benefits from construction-related expenditures and employment. Temporary disturbance and inconvenience to park visitors from construction activities would be expected. Because of the negligible impacts on socioeconomic values anticipated from project actions, socioeconomic values were dismissed as an impact topic in this document.

Although kiosks and/or interpretive and directional signs are proposed under the action alternatives, a comprehensive park sign plan is beyond the scope of this project. The park recognizes that additional trail signs would be useful for directing visitors in the high use falls area to other important interpretive sites (e.g. the Patowmack Canal locks and the ruins of Matildaville located further south in the park).

The Potomac River possesses two additional protections. The National Trails System Act identifies the C & O Canal Towpath as an official segment of the Potomac Heritage National Scenic Trail. The Potomac River was also designated an American Heritage River by Presidential proclamation.

## **Section II. Description of Alternatives**

This section describes the alternatives that were considered to fulfill the purpose and need for action that was described in Section I.

### **Alternative A - Maintain Current Management and Existing Conditions (No Action)**

Under this alternative, no action would be taken to improve the system of overlooks and trails, other than routine and cyclic maintenance. The two existing developed overlooks would be retained, and maintenance actions would be taken to slow or arrest their deteriorating condition for as long as practicable. No improvements would be made in the Shade Tree/Jetty area. Park staff would continue to rehabilitate social trails by such means as obscuring them with fallen branches/vegetation, large rocks, and other natural materials. Visitor safety and resource protection concerns would continue to be addressed through signs, other printed information, and roving patrols of park staff and volunteers.

### **Alternative B - Improve Overlooks 1 and 2, and Fisherman's Eddy Access**

Under this alternative, the two existing developed overlooks (including the approach paths) would be rehabilitated and improved. This alternative is depicted in Figure 3. Both overlooks would be designed and constructed to harmonize with their natural setting, and would incorporate the use of stone walls and wooden rail barriers. The rehabilitated overlooks would be located in the same approximate location as the existing structures, differing slightly in their footprint and configuration.

The area between the two developed overlooks (below the Canal Trail and above Fisherman's Eddy) would be graded and revegetated to restore a more natural appearance. A study would be undertaken to determine if boulders and/or riprap could be used to stabilize the foot of the upper portion of the area. This study would also determine how to adequately protect any exposed archeological remains of the iron forge/foundry, and to establish natural appearing contours. Native vegetation would be reestablished in the area to protect against erosion from future high water events. Improvements would be made at the "trailhead" and in the upper section, only to the extent necessary to better define the route and provide information about its purpose. Waterbars or other erosion preventing mechanisms would be installed in a way that would not impact underlying archeological resources.

Access to the Shade Tree/Jetty area would be discouraged by removing the existing trail, construction of additional rail fence, and the use of signs directing visitors to the two developed overlooks. The existing chain link fence above the Spout would be removed and the area would be restored to a natural condition.

### **Alternative C -Improve Overlooks 1 and 2, Fisherman's Eddy Access, and Construct Shade Tree-Jetty Loop Trail and Overlooks**

Under this alternative (see Figure 4), improvements would be made to the two existing developed overlooks as described in Alternative B, along with shore stabilization and revegetation in the area between the overlooks, including the Fisherman's Eddy access. In addition, a trail loop would be constructed through the Shade Tree/Jetty area, beginning near the north end of the visitor center and rejoining the Canal Trail just beyond the Visitor Center south ramp, at the existing entrance to the Jetty area. Kiosks at either end of the loop trail would provide visitors with orientation, interpretation and safety information.

The loop trail would include overlooks near the Shade Tree and at the Jetty, offering scenic views of the river and falls. Incorporated into the design of the loop trail would be sections of above grade boardwalk that would accommodate the accessibility needs of disabled visitors, and offer additional protection in sensitive resource areas. Similar to the Olmsted Island Trail across the river, the use of stone walls, wooden fencing, signs, and other landscaping elements would be included in the design to clearly define the trail for visitors and discourage off-trail use of the area.

The design would address resource protection, aesthetics and accessibility. However, sustainability issues would remain a concern in the Fisherman's Eddy access area. Sustainability in the loop trail and overlook areas would be addressed through construction techniques and materials that would allow for the removal of handrails and other elements in order to reduce damage during high water or flood events.

### **Alternative C1 (*Preferred*) -Improve Overlooks 1 and 2, and Construct Shade Tree-Jetty Loop Trail and Overlooks**

The actions proposed under this alternative (see Figure 5) are generally the same as those of Alternative C. Alternative C1, however, would defer measures to stabilize and restore the area between Overlooks 1 and 2 and the Fisherman's Eddy access, pending future investigations to determine whether such improvements are feasible and sustainable. As described for Alternatives B and C, improvements would be made to the two existing developed overlooks. In addition, a trail loop would be constructed through the Shade Tree/Jetty area, beginning near the north end of the visitor center and rejoining the Canal Trail just beyond the Visitor Center south ramp, at the existing entrance to the Jetty area. Kiosks at either end of the loop trail would provide visitors with orientation, interpretation and safety information.



The loop trail would include new overlooks near the Shade Tree and at the Jetty, offering scenic views of the river and falls. Incorporated into the design of the loop trail would be sections of above-grade boardwalk that would accommodate the accessibility needs of disabled visitors, and offer additional protection in sensitive resource areas. Similar to the Olmsted Island Trail across the river, the use of stone walls, wooden fencing, signs, and other landscaping elements would be included in the design to clearly define the trail for visitors and discourage off-trail use of the area.

The design would address resource protection, aesthetics, accessibility, and sustainability issues for the loop trail and overlooks. This would be accomplished through the use of construction techniques and materials that would allow for the removal of handrails and other elements in order to reduce damage during high water or flood events. Sustainability issues regarding the Fisherman's Eddy access and treatment of the area between Overlooks 1 and 2 would be deferred for future study.

### **Actions Common to Alternatives B, C and C1**

Each of the “action” alternatives seeks to improve opportunities for visitors to safely enjoy the park, while protecting natural and cultural resources. These alternatives are intended to make use of design and construction materials and techniques that harmonize and blend in with the natural environment. Specifically, the following actions are common to these alternatives:

- The use of natural materials such as wood and stone would be utilized to ensure that the improvements blend in with the park’s environmental character. Trails, boardwalks, viewing platforms, and other improvements would be sensitively designed to harmonize with the landscape as viewed from within the park, from the river, and from the Maryland shore.
- Each alternative seeks to proactively manage the area’s intense visitor use through appropriate design methods. Trails (while constructed of natural materials) would provide well-defined pathways to guide visitors. Improved signage, stone walls, fencing and other barriers would discourage off-trail use within this heavily used part of the park.
- Viewing platforms, trails, boardwalks, and other structures would be engineered to withstand damage from high water and floating debris to the greatest extent practicable.
- Each alternative addresses accessibility issues, and would resolve the lack of access for all visitors that now exists at the developed overlooks and Jetty area. Trails, overlooks, viewing platforms, and measures to impart information to visitors would be included to the greatest extent feasible in each alternative.

**Alternatives Considered but Not Pursued**

*New Trail Between the Jetty and Overlook 1* - A new trail that would provide a connection between the Jetty and Overlook 1 via the deep ravine that separates them was considered but not pursued. The existing Canal Trail already provides such a connection, so a new trail would be redundant. In addition, the ravine area is known to provide habitat for rare and uncommon plant species.

*New Trail Between Overlooks 1 and 2* - A new trail connecting the two existing developed overlooks was considered but not pursued for the same reasons as noted above.

**Table 1. Summary of Alternatives**

<b>Alt. A – (Maintain Current Management &amp; Existing Conditions)</b>	<b>Alt. B – (Improve Overlooks 1 &amp; 2, &amp; Fisherman's Eddy Access)</b>	<b>Alt. C (Improve Overlooks 1 &amp; 2 &amp; Construct New Trail Loop/Overlooks &amp; Fisherman's Eddy Access)</b>	<b>Alt. C1 (Improve Overlooks 1 &amp; 2 &amp; Construct New Trail Loop/ Overlooks)</b>
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<ul style="list-style-type: none"> <li>• No action taken to improve overlooks and trails other than routine maintenance.</li> <li>• Existing overlooks are retained in current deteriorated condition.</li> </ul>	<ul style="list-style-type: none"> <li>• Overlooks 1 and 2 are reconstructed to fit in with the natural landscape. Constructed with a combination of wood decks, concrete slabs, stone walls, wood rails.</li> <li>• Overlooks and approach walkways are made accessible for disabled visitors.</li> <li>• Attempts would be made to stabilize river access area between Overlooks 1 and 2; upper area graded and revegetated</li> <li>• Design would attempt to provide a safe access to water edge.</li> <li>• Access to the Shade Tree/Jetty area discouraged by fencing; no trails or overlooks developed in these areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Overlooks 1 and 2 are reconstructed to fit in with the natural landscape. Constructed with a combination of wood decks, concrete slabs, stone walls, wood rails.</li> <li>• Overlooks and approach walkways are made accessible for disabled visitors.</li> <li>• Attempts would be made to stabilize river access area between Overlooks 1 and 2; upper area graded and revegetated</li> <li>• Design would attempt to provide a safe access to water edge.</li> <li>• Loop trail/boardwalk constructed in the area between the visitor center and river. Would incorporate handrails, stone wall segments, fencing, interpretive signs, etc. to discourage off-trail use.</li> <li>• New accessible overlooks constructed at the Shade Tree and Jetty areas that would blend with the natural environment.</li> <li>• Trailhead kiosks would be constructed to orient visitors and provide safety/interpretive information.</li> </ul>	<ul style="list-style-type: none"> <li>• Overlooks 1 and 2 are reconstructed to fit in with the natural landscape. Constructed with a combination of wood decks, concrete slabs, stone walls, wood rails.</li> <li>• Overlooks and approach walkways are made accessible for disabled visitors.</li> <li>• River access stabilization would be left for future study.</li> <li>• Loop trail/boardwalk constructed in the area between the visitor center and river. Would incorporate handrails, stone wall segments, fencing, interpretive signs, etc. to discourage off-trail use.</li> <li>• New accessible overlooks constructed at the Shade Tree and Jetty areas that would blend with the natural environment.</li> <li>• Trailhead kiosks would be constructed to orient visitors and provide safety/interpretive information.</li> </ul>
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### **Section III. Affected Environment**

#### **Visitor Use and Safety**

Primary visitor use activities within the park involve viewing the falls and using the picnic area. Other popular activities include hiking, birdwatching, horseback riding, climbing, cross country skiing, and using the park as an access point for canoeing and kayaking on the Potomac River. A visitor use study was completed for the park during the spring of 1996, with information compiled from 443 returned questionnaires. The study data revealed that the most common visitor activities were viewing the falls (73%), walking/hiking (56%), and viewing wildlife (41%). Two-thirds of the visitors had previously been to the park. On past visits, visitors' most common activities were viewing the falls (88%), walking/hiking (75%), visiting Patowmack Canal (56%), and viewing wildlife (50%). Thirty-four percent of the visitors were in groups with friends, and 31% were with families. Over half of the visitors (51 %) were between the ages of 21 and 40, and 11% were 15 years old or younger.

According to annual visitation statistics, use of Great Falls Park has increased dramatically over the past decade, reflecting corresponding population growth in the Washington, D.C. metropolitan area and increased interest in using local park systems. Approximately 500,000 visitors a year now use the park, creating a carrying capacity problem for a number of the park's facilities. The stresses of increased visitation are evident in congested roads outside the park, inadequate numbers of parking spaces, and threats to natural and cultural resources. Visitors prefer to stay close to the river and often seek the shortest route between river viewing sites. In so doing, they often walk through the woods rather than returning to the main park trail. This has led to the establishment social trails, impacting areas of sensitive and rare vegetation and contributing to soil erosion.

The 1996 visitor use study revealed that 96% of the visitors learned about river safety hazards from park signs. Fifty-one percent indicated that they referred to park bulletin boards. The sources that visitors rated as providing the highest ("very effective" to "extremely effective") level of safety information were park staff, signs, bulletin boards, and brochures. Despite the variety of warnings, many visitors tend to disregard the seriousness of the hazards as they seek their own opportunities along the rocky shore. In addition to venturing into unsafe locations, visitors scrambling on the rocks in front of the overlooks disrupt the viewing experience of those who stay at the overlooks.

Over the past 20 years, more than 30 drownings have occurred in the Potomac River, either at or near Great Falls. Almost all have been the result of individuals accidentally falling into the river, or attempting to swim or wade in the dangerous waters. The island north of the visitor center is a particularly treacherous area, especially during high water events, with water rushing by slippery rocks. Several warning signs have been placed in this and other shore areas. However, visitors persist in

scrambling down steep rocks to access private locations, or to be closer to the water.

Rock climbing is another popular activity that has also routinely accounted for injuries, and five fatalities have resulted from climbing accidents over the past 20 years. Other injuries (mostly minor) have resulted from visitors tripping on the trails and rocks. The terrain is rough along the shore, and paths and trails are uneven.

## **Natural Resources**

Approximately 700 acres of Great Falls Park is considered a “natural zone”, consisting primarily of dense, second-growth eastern deciduous forest. Upland areas are dominated by oak, hickory, and tulip poplar. Sycamore, red maple, box elder, and ash are found in the floodplain. The most mature stands are found in the northwest sections of the park and along its southern edge. Most of the forested areas have reestablished on formerly cleared and tilled lands.

The grandeur of Great Falls Park is derived from the Potomac River and the area’s dramatic geology. The exposed bedrock is part of the Wissahickon Formation, associated with the Piedmont Plateau Province. This formation (among the oldest on the East Coast - estimated at 1.1 billion years old) defines the East Coast fall line where exposed. Uplands and hillsides are covered by deep residual soils, rock outcrops, and thick woodlands.

The Potomac’s turbulent waters flow from the Great Falls into Mather Gorge, the upper 3 miles of which forms the park’s eastern boundary. The Potomac has a long history of dramatic floods, providing further evidence of its wild and at times destructive nature. Visitors can readily compare and gain an understanding of the magnitude of previously documented flood events by viewing the markings recorded on a post along the path to Overlook 2. The flood of March, 1936 was the highest recorded, with flood waters cresting well above the current picnic area. In June, 1972, flooding brought on by Hurricane Agnes reached 22.03 ft. High water levels recorded for other significant flood events were 13.5 ft. in February, 1984; 16.99 ft. in November, 1985; 19.31 ft. in January, 1996; and 17.83 ft. in September, 1996.

The floods of January and September 1996 caused significant damage to trails, overlooks, and historic resources. The floods scoured out areas and deposited great quantities of sand. Erosion and deposition obscured trails and contributed to increased visitor wandering, which in turn resulted in new social trails and more erosion. After the 1996 floods, protective chain link fencing was installed at the popular “Spout” overlook.

Other hydrological features within the park include ephemeral wetlands, streams, a swamp, and a

shallow pond. None of these water resources would be affected by proposed project undertakings.

The park's wildlife is representative of eastern hardwood forests, including white tail deer, beaver, eastern gray squirrel, muskrat, raccoon, chipmunk, opossum, rabbit, and red and grey fox. Black bears and possibly bobcats may occasionally use the park. Waterfowl, herons, osprey, and American bald eagles can be seen along the river's edge, while turkey and numerous species of forest birds inhabit the park's woodlands. Many species of reptiles, amphibians, fish, and invertebrates inhabit the park, however a comprehensive inventory of these groups has not been conducted. One resident, the Wood Turtle (*Clemmys insculpta*), is a state-listed threatened species.

Wildflowers and other herbaceous plants are plentiful and varied in the park, with over 100 families of vascular plants represented. The park's distinctive environment is home to many rare and regionally uncommon plant species. Reports on the rare plants were prepared in 1993 and 1994, and ongoing field surveys continue to document plant locations. The proposed project area was surveyed to determine the existence of rare plant populations that might be impacted. The following rare and regionally uncommon plants are located in the area between Overlooks 1 and 2:

**Table 2 – Rare and Uncommon Plants**

Scientific/Common Name	State Status	Comments
<i>Solidago simplex</i> var. <i>racemosa</i> ; (sticky goldenrod)	S1*	Occurs on open rocks along the river throughout the park
<i>Asclepias verticillata</i> ; (whorled milkweed)	Not listed	Uncommon in the Piedmont; ranked S3 in MD
<i>Celtis tenuifolia</i> ; (upland hackberry)	Not listed	Uncommon in the Piedmont
<i>Clematis viorna</i> ; (leatherflower)	Not listed	A species widespread but never abundant in VA; ranked S3 in MD
<i>Clitoria mariona</i> ; (butterfly pea)	Not listed	A species widespread but never abundant in VA



<i>Commelina erecta</i> ; (slender dayflower)	Not listed	Scattered locations in VA but not common in the Piedmont; ranked S3 in MD
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\*S1 ranking: the species is extremely rare with 5 or less occurrences in the state.

S2 ranking: the species is very rare with less than 20 occurrences in the state.

S3 ranking: the species is on a watch list with 20 to 100 occurrences in the state.

The only rare plant that is located in the area between the falls and the visitor center is *Solidago simplex* var. *racemosa*. Other rare plants that are found outside the project area would not be directly impacted by construction, but may be affected by wandering visitors. These include *Baptisia australis* (S2 in Virginia), *Eleocharis elliptica*, and *Spartina pectinata*; all are found north of the proposed trail.

Foot traffic, development of social trails, and associated erosion threatens rare plant populations. In order to protect these species and their habitats, the following recommendations were made in the plant survey report:

- Discourage hikers from walking on the bedrock terrace where many rare and uncommon species occur, especially in the high rocky area above the river.
- Discourage casual walkers from exploring the island north of the visitor center formed by the old canal. This is the habitat of many rare and uncommon species.

## Cultural Resources

Numerous cultural resources are located in the park, the earliest consisting of archeological evidence of prehistoric Native American camps and occupation areas. While the Patowmack Canal has been the subject of several cultural resource investigations, the remainder of the park has not received extensive archeological or historic resource investigation. Because of the potential for both historic and prehistoric archeological resources in some of the areas subject to impact from the proposed alternatives, archeological surveys would be required in those locations not previously developed or thoroughly investigated. If archeological surveys show that there are fragile resources in the area that will be adversely affected by construction, this portion of the Alternative would not be accepted.

The ruins of the Patowmack Canal are recognized as the park's most significant historic resource. The canal was constructed between 1786 and 1802 by the Patowmack Company, a partnership of Virginia and Maryland investors under the direction of George Washington. Washington envisioned the canal as a critical link in efforts to make the Potomac River navigable as far as the Ohio River Valley. Providing free trade and commerce along the Potomac was seen as an important step in binding the western frontier to the new

Nation. Despite its ambitious beginnings, the Patowmack Company succumbed to financial problems and ultimately went bankrupt in 1828. The C & O Canal Company then briefly took over the canal, but abandoned it in 1830.

The canal was approximately one mile long and contained five locks to raise and lower boats around the 76-foot drop of the Great Falls. Many stone structures, Locks 1-3, and the canal prism with its stone walls remain. The remains of the town of Matildaville (developed by Henry “Light Horse Harry” Lee) are along the edge of the holding basin. Matildaville served as the headquarters for the Patowmack Company and housed canal construction workers. The locks and Matildaville are located well to the south of the project area and would not be affected by the proposed undertakings.

The “Potomac Canal Historic District” was listed on the National Register of Historic Places in 1979 (NR # 79003038). The district includes the ruins of the Patowmack Canal and Matildaville. In 1982, the historic district was further recognized for exceptional national significance by being designated a National Historic Landmark. The Patowmack Canal was also designated a Virginia Historic Landmark and is listed on the Historic American Engineering Record. Lock 1 was designated a National Historic Civil Engineering Landmark by the American Society of Civil Engineers.

The upper portion of the canal crosses the recreation zone and separates the overlooks of the falls from the visitor center and part of the picnic area. This portion of the canal is impacted by recreational use, and the current designated crossing point consists of fill material placed within the canal prism. The canal falls within the area of potential project effects associated with access trail improvements. Archeological investigations would therefore be required prior to construction due to the high potential for canal-related archeological resources in these areas. The construction methods proposed for crossing the canal would also receive cultural resource review to ensure adequate protection of canal structural elements.

A memorial plaque to George Washington is located between the falls and the visitor center. Foundation walls of the historic Samuel Briggs gristmill are close to the canal crossing south of the visitor center. Erosion has occurred at this site due to development of social trails. The Potts-Wilson iron forge/foundry (located between Overlooks 1 and 2) has been previously studied and attempts have been made to stabilize the site by covering it with fill. This area is subject to damage from erosion, foot traffic, and flood action.

The park’s primary identified cultural zone, consisting of the Patowmack Canal and its associated resources, encompasses approximately 30 acres. There are additional acres within the Park containing

cultural resources as well, including prehistoric Native American sites and historic road traces, which fall outside the Canal Zone.

### **Park Operations and Facilities**

The park's high level of visitation, history of accidents, and other potential visitor use conflicts have led to the necessity of providing a visible and rapid response team of law enforcement and rescue personnel. The U.S. Park Police provide law enforcement on the land and river. Two horse-mounted Park Police officers are stationed at the park year-round, and are assisted on weekends by additional officers in cruisers or on motor scooters. Most visitor violations involve bringing alcohol into the park, or wading or swimming in the river. When patrol Rangers observe emergencies or violations they contact the Park Police dispatcher, who in turn notifies the officer on duty. The Park Police helicopter "Eagle" is often dispatched to assist with rescues.

A multi-agency agreement provides for mutual aid and assistance for river safety patrols and rescues. Signatories to the agreement are the State of Maryland; Montgomery County, Maryland; Commonwealth of Virginia; Fairfax County, Virginia; District of Columbia; and the NPS. Under this agreement, the park supports and assists the other partnership agencies with quick response in search and rescue operations, and provides space for the installation and storage of support systems and equipment. The park also agrees to assist with the regulation of recreational activities. To meet this agreement, some park personnel are trained in vertical rock rescue operations.

Within the project area, existing facilities include the visitor center, the concrete pads of the river overlooks, and the network of trails that access the overlooks. The concrete pads of the overlooks are in a deteriorated condition. The access trails are uneven, non-accessible by disabled persons, and in some locations present tripping hazards. An informal trail leads from the main park trail to the overlook area below the "Spout". Unsightly chain link fencing has been temporarily placed around this viewing point (site of a former overlook) to protect visitors from falling.

The maintenance facility is distant from the present project area and is located near the park entrance. The park has a boat launch site for emergency river access at Sandy Landing, downstream at the lower end of Mather Gorge.

## Section IV. Impacts and Environmental Consequences

The National Environmental Policy Act (NEPA) requires that environmental documents disclose the environmental impacts of the proposed federal action, reasonable alternatives to that action, and any adverse environmental effects that cannot be avoided should the proposed action be implemented. This section analyzes the environmental consequences of the alternatives on the impact topics. These analyses provide the basis for comparing the effects of the alternatives.

### Methodology

The impact analyses and conclusions are based on park staff knowledge of the resources and project area; review of existing literature and park studies; information provided by experts within the NPS and other agencies; and professional judgement.

**General Definitions.** The following definitions were used to evaluate the intensity, duration, and cumulative nature of impacts associated with project alternatives:

**Intensity** is a measure of the severity of an impact. The intensity of an impact may be:

*Negligible* - when the impact is localized and not measurable, or at the lowest level of detection;

*Minor* – when the impact is localized and slight but detectable;

*Moderate* - when the impact is readily apparent and appreciable; or

*Major* - when the impact is substantial and highly noticeable.

**Duration** is a measure of the time period over which the effects of an impact persist. The duration of impacts evaluated in this EA may be:

*Short-term*, when impacts occur only during construction or last less than one year; or

*Long-term*, when impacts last one year or longer.

**Cumulative impacts** are impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

**Cultural Resources Analyses.** The assessment of impacts on cultural resources and historic

properties was made in accordance with regulations of the Advisory Council on Historic Preservation (36 CFR 800) implementing Section 106 of the National Historic Preservation Act. Following a determination of the areas of potential effect, cultural resources were identified within these areas that are either listed in or eligible for listing in the National Register of Historic Places.

An assessment was made of the nature and extent of effects on cultural resources anticipated from implementing proposed undertakings. Cultural resources can be affected by actions that alter in any way the attributes that qualify the resources for inclusion in the National Register. Adverse effects can result when the integrity of a resource's significant characteristics is diminished. Consideration was given both to the effects anticipated at the same time and place of the undertaking, and to those potentially occurring indirectly at a later time and distance.

### **Alternative A - Maintain Current Management and Existing Conditions (No Action)**

#### **Visitor Use and Safety**

Under this alternative, the NPS would neither rehabilitate the existing developed overlooks, nor construct other new facilities to enhance the experience and safety of the visiting public. Management of the area would continue on a status quo basis, and the current broad range of recreational opportunities would remain available. Visitors would continue to receive information about the importance of staying on established trails from park staff, roving patrols, signs, brochures, etc.

For lack of adequate NPS provided facilities, many visitors would continue to seek their own opportunities by scrambling along the rocky shoreline, potentially placing themselves in hazardous situations. The potential for serious injuries or fatalities would remain at current levels, and perhaps increase should future visitation numbers also rise. The overlooks would also likely continue to be inaccessible or difficult to negotiate for disabled visitors because of uneven trails and other deficiencies.

#### **Conclusion**

Continuation of current management policies would retain a broad range of recreational opportunities, but visitors would likely continue to be at risk of injury by straying from designated trails. Social trail traffic would also continue to degrade sensitive resources. Consequently, minor to moderate long-term adverse impacts on visitor use and safety would be anticipated were the park to take no action.

## **Natural Resources**

Without new and/or improved facilities to manage visitor use, the park's flora (including several rare and uncommon plant species) would continue to face moderate long-term adverse impacts due to visitors departing designated trails and unknowingly trampling these sensitive species. Soil erosion would also be an adverse consequence of social trail establishment. Minor impacts to wildlife species would be anticipated from the continuation of current management practices, as visitors departing the designated trail system might be more likely to disturb animals in wooded areas and perhaps burrowing/nesting areas. There would be negligible adverse effects on the park's water and other natural resources.

## **Conclusion**

Moderate long-term adverse impacts to the park's flora (including rare and uncommon plant species) may result from continuation of current management policies, and the decision not to construct trail/overlook improvements. There would be minor adverse impacts on wildlife species, and negligible adverse impacts on water resources. The park would continue to provide educational outreach to inform visitors of the importance of not disturbing sensitive natural resources.

## **Cultural Resources**

Under existing cultural resource policies and legislative requirements, the NPS would continue to stabilize and preserve significant historic resources as feasible. However, the stone walls of the Patowmack Canal and other historic resources would likely continue to face threats of adverse impacts by visitors inadvertently walking on the walls, loosening and destabilizing the stonework. The park would evaluate possible measures to mitigate adverse effects (e.g. restricting visitor access in sensitive areas, educational outreach, etc.)

## **Conclusion**

Significant cultural resources would be protected to the maximum extent permitted under current policies. However, potential adverse effects may continue from visitor use impacts.

## **Park Operations and Facilities**

Park law enforcement and rescue operations would continue under existing policies and staffing levels. The potential for increasing visitor use would require law enforcement and rescue personnel to

reactively respond to corresponding numbers of emergency situations. There would be no change in the park's management zoning or other administrative measures regarding resource protection and visitor use.

The trails and overlooks would continue to deteriorate, in some instances presenting potentially hazardous conditions. The profusion of social trails would likely remain. To the extent feasible, routine maintenance activities would attempt to correct deteriorated conditions, and deter the use of undesignated trails. Constructed facilities, particularly the overlooks, would remain aesthetically out of character with the natural environment, and would detract from the park's scenic appeal.

## **Conclusion**

Faced with high visitation numbers, park law enforcement and rescue operations would continue to react to correspondingly high levels of emergency situations. The park's management zones would remain in place. Minor to moderate long-term adverse impacts would occur as overlooks and trails continue to deteriorate, presenting safety hazards and visual incompatibility with the scenic landscape.

## **Alternative B - Improve Overlooks 1 and 2, and Fisherman's Eddy Access**

### **Visitor Use and Safety**

The rehabilitation and upgrading of Overlooks 1 & 2 and their approach walkways would enhance the visitor experience at these popular locations. The overlooks would be sensitively designed with materials intended to blend with the natural environment. Benches would be provided for visitors to sit and enjoy the scenery. Facility improvements would permit disabled individuals to easily access these viewing destinations.

Visitor safety would also be improved by providing better-managed access and overlook facilities. Likewise, new signs would improve visitor orientation, and better inform visitors of river safety and resource protection. These facilities would provide more opportunities to present the public with information in a positive on-site setting. Closing visitor access to the Jetty area behind the visitor center would improve safety in this area and protect resources. This would also discourage visitors from accessing the island north of the visitor center, which is a particularly dangerous area.

The NPS would undertake design efforts to improve access to Fisherman's Eddy. However, the potential safety and sustainability of access improvements in this area are presently unknown without further study of river dynamics.

Despite the safety and resource protection benefits of improved overlooks, trails, and other measures to better manage visitor circulation, visitor crowding would likely become an issue along the designated access routes. This would occur as visitors, discouraged from dispersing throughout the area as they currently do, would be concentrated along the existing trails/overlooks. Crowding would likely worsen if visitation increased in the future.

## **Conclusion**

Improvements to the overlooks and access trails would have long-term minor to moderate benefits on visitor use and safety. The visitor experience would be enhanced with the construction of more aesthetically compatible facilities, informative signs, and measures to improve visitor safety and resource protection by restricting unauthorized access. However, crowding may worsen along the designated trails and overlooks if additional facilities were not constructed.

## **Natural Resources**

The enclosed overlooks and designated walkways would help keep visitors in approved areas and away from sensitive resource locations. Rail fences and visual barriers of vegetation would discourage visitors from cutting directly from one overlook to the other through areas of threatened plant species. This would provide long-term minor to moderate benefits on these species. Restricting access to the Jetty area would also protect sensitive plants in that area and allow the restoration of the area to natural conditions.

Proposed stabilization and revegetation of the shore between Overlooks 1 & 2 would help reduce erosion, as would other measures intended to prevent the use or proliferation of social trails. However, the sustainability of this work is undetermined without further study. Shore stabilization would require consultation with the U.S. Army Corps of Engineers to ascertain permit requirements for placing riprap and fill material. Erosion control measures would be resolved during construction. Short-term negligible adverse impacts would be anticipated on water resources as a result of project undertakings.

The U.S. Fish and Wildlife Service has been consulted about potential impacts of project generated noise on bald eagles nesting on Conn Island upstream of the falls. This coordination would continue, and seasonal restrictions or other necessary conditions would be included in the project construction requirements. Additional endangered species consultation would be required with the appropriate Virginia and Maryland wildlife protection agencies.



## **Conclusion**

Long-term minor to moderate benefits would occur to the park's flora (including rare and uncommon plant species) from measures intended to discourage visitors from venturing into restricted areas or departing the designated trail system. The effectiveness of shore stabilization (including revegetation efforts) to prevent erosion in the Fisherman's Eddy area is presently undetermined without further study. The NPS would consult with federal and state agencies regarding appropriate mitigation and/or permit requirements for threatened plant and wildlife species. Short-term negligible adverse effects on water resources would be anticipated. The park would continue to provide educational outreach to inform visitors of the importance of not disturbing sensitive natural resources.

## **Cultural Resources**

Project undertakings would be anticipated to have no adverse effect on significant historic properties. Measures to keep visitors on designated trails would substantially reduce the potential for stone walls or other features to be destabilized by visitors walking on top of these resources. Stabilization and revegetation of the shore between Overlooks 1 & 2 would help reduce erosion in that area, and protect the buried remains of the historic iron forge/foundry. Engineering studies would be required to determine the types of measures best suited to stabilize the area and prevent erosion, as well as protect cultural resources.

Project undertakings would be reviewed in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended. The NPS would notify and consult with the Virginia State Historic Preservation Officer and the Advisory Council on Historic Preservation as necessary. The NPS would carry out data recovery excavations if significant archeological resources were identified that could not be avoided by project redesign. Should presently unidentified archeological resources be discovered during construction, work in that location would stop until the resources are properly recorded by the NPS archeologist and evaluated under the eligibility criteria of the National Register of Historic Places. If (in consultation with the State Historic Preservation Office) the resources were determined eligible, appropriate measures would be implemented either to avoid further resource impacts or to mitigate their loss or disturbance. In compliance with the Native American Graves Protection and Repatriation Act of 1990, the NPS would also notify and consult concerned tribal representatives for the proper treatment of human remains, funerary and sacred objects should these be discovered during the course of the project.

## **Conclusion**

Undertakings proposed under this alternative would be anticipated to have no adverse effect on historic properties. Measures to keep visitors on designated trails would have minor to moderate long-term benefits on the protection of historic features such as the stone walls of the Patowmack Canal. However, further study would be required to determine whether efforts to stabilize the area between Overlooks 1 and 2 would also provide adequate protection of buried cultural remains in that area.

## **Park Operations and Facilities**

Measures to better manage visitor use and discourage visitors from entering unsafe areas near the river would benefit park law enforcement and rescue operations. With visitor numbers likely to increase, the park would be in a better position to proactively prevent unsafe situations from occurring rather than merely having to respond to emergency situations with limited personnel. There would be no change in the way the park is currently zoned.

Because of the intent to make facility improvements sustainable and capable of withstanding flood events, maintenance staff would be required to remove and provide temporary storage for railings and other removable features that might otherwise be damaged or swept away. Maintenance staff would assume the additional tasks of maintaining the new overlook structures. Long-term sustainability of the Fisherman's Eddy access remains unknown without further study.

## **Conclusion**

Park operations (particularly law enforcement and rescue) would receive minor to moderate long-term benefits from facility improvements and measures intended to restrict visitor access in unsafe areas. Park maintenance staff would have additional responsibilities to remove/replace railings and other structural features during flood events. Periodic maintenance would be required for the new overlook structures, but the time and costs incurred would be expected to offset, or not substantially exceed, what the park presently expends to maintain the existing deteriorated facilities. Because the long-term sustainability of the Fisherman's Eddy access is undetermined, the impacts on park operations in this area cannot be fully determined at the present time.

## **Alternative C - Improve Overlooks 1 and 2, Fisherman's Eddy Access, and Construct Shade Tree-Jetty Loop Trail and Overlooks**

### **Visitor Use and Safety**

Rehabilitation of Overlooks 1 and 2 would have the same benefits for visitor use and safety as those described for Alternative B. In addition, the construction of the proposed loop trail/boardwalk and additional overlooks in the Shade Tree/Jetty area behind the visitor center would provide convenient and safe access for viewing the river in that location. In comparison with Alternative B, the expanded trail system and river viewing facilities would better disperse visitors and would assist the park in accommodating anticipated future visitation increases. All the overlooks would be sensitively designed with materials intended to blend with the natural environment.

Establishment of the trail/boardwalk loop and the new information/directional kiosks at the trailheads would improve the visitor experience. The loop would be well-integrated with the park's existing circulation system. Kiosks would direct and orient visitors, and provide information on safety and resource protection. The loop and overlook areas would be accessible for disabled individuals, allowing them greater opportunities to view the falls.

Safety in the area behind the visitor center would be greatly improved by managing access in that area, and providing increased visitor education about river hazards. The new overlooks in the Shade Tree/Jetty area would be in safe viewing locations, and new signs and railings would encourage visitors to remain on the loop and overlooks rather than venturing off into hazardous areas along the rocks. Additional signs and displays along the loop trail would also improve interpretation and impart requirements for protecting park resources.

As under Alternative B, the NPS would undertake designs for improved access to Fisherman's Eddy. However, the safety and sustainability of these measures are presently unknown without further study of river dynamics.

## **Conclusion**

Improvements to the existing overlooks, and construction of a loop trail/boardwalk with additional overlooks in the Shade Tree/Jetty area, would have long-term moderate benefits on visitor use and safety. The visitor experience would be enhanced with the construction of more aesthetically compatible facilities, educational signs/kiosks, and other measures to improve visitor safety and resource protection. The expansion of trails and overlooks would better disperse visitors and relieve crowding.

## **Natural Resources**

Control of trail use and visitor access would help protect and manage natural resources in the area of

the park near the visitor center. Although about 150 individuals of the species *Solidago simplex* var. *racemosa* would be impacted by the proposed construction of the loop trail, thousands of these plants occur on the rocks along the river throughout the park. Park Natural Resource Management staff would monitor *Solidago simplex* var. *racemosa* populations in coordination with the Virginia Natural Heritage Program to measure this impact. By better managing visitor access and traffic, social trails to the north of the proposed loop would be minimized which would also assist in protecting populations of other rare plants (*Baptisia australis*, *Eleocharis elliptica*, and *Spartina pectinata*).

As in Alternative B, coordination with the U.S. Fish and Wildlife Service and the states of Virginia and Maryland would continue regarding bald eagles nesting on Conn Island upstream of the falls, and other rare species. Project construction specifications would include any necessary limitations on when construction could occur so as to avoid disturbing sensitive nesting or breeding periods. Additional endangered species consultation would be required with the appropriate Virginia and Maryland resource protection agencies.

Proposed stabilization and revegetation of the shore between Overlooks 1 & 2 would help reduce erosion, as would other measures intended to prevent the use or proliferation of social trails. However, the sustainability of this work is undetermined without further study. Shore stabilization would require consultation with the U.S. Army Corps of Engineers to ascertain permit requirements for placing riprap and fill material. Erosion control measures would be resolved during construction. Short-term negligible adverse effects would be anticipated on water resources as a result of project undertakings.

## Conclusion

Minor short-term adverse effects to the rare plant species *Solidago simplex* var. *racemosa* would be anticipated from trail construction. Park staff would undertake appropriate monitoring. However, in the long-term, moderate benefits would occur to the park's flora (including other rare and uncommon plant species) by implementing measures intended to discourage visitors from venturing into restricted areas or departing the designated trail system.

The effectiveness of shore stabilization (including revegetation efforts) to prevent erosion in the Fisherman's Eddy area is presently undetermined without further study. The NPS would consult with federal and state agencies regarding appropriate mitigation and/or permit requirements for threatened plant and wildlife species. Short-term negligible adverse effects on water resources would be anticipated. The park would continue to provide educational outreach to inform visitors of the importance of not disturbing sensitive natural resources.

## **Cultural Resources**

In common with Alternative B, proposed project undertakings are anticipated to have no adverse effect on significant historic properties. Measures to keep visitors on designated trails would substantially reduce the potential for stone walls or other features to be destabilized by visitors walking on top of these resources. The proposed stabilization and revegetation of the shore between Overlooks 1 & 2 would help reduce erosion in that area, and protect the buried remains of the historic iron forge/foundry. Engineering studies would be required to determine the types of measures best suited to stabilize the area and prevent erosion, as well as protect cultural resources.

The loop trail would provide access to the George Washington memorial plaque that is found in the woods near the falls. Managing visitor access in that area would also enhance protection of the nearby gristmill site. Establishment of the loop trail would require two crossings of the historic Patowmack Canal near the visitor center. These crossings would consist of elevated boardwalk bridges anchored to abutments on either side of the canal that would avoid impacting the stone walls (no support piers would be constructed within the canal prism). The replacement of the existing fill crossing with these boardwalk spans would visually enhance the canal's historic character.

Project undertakings would be reviewed in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended. The NPS would notify and consult with the Virginia State Historic Preservation Officer and the Advisory Council on Historic Preservation as necessary. The NPS would carry out data recovery excavations if significant archeological resources were identified that could not be avoided by project redesign. Should presently unidentified archeological resources be discovered during construction, work in that location would stop until the resources are properly recorded by the NPS archeologist and evaluated under the eligibility criteria of the National Register of Historic Places. If (in consultation with the State Historic Preservation Office) the resources were determined eligible, appropriate measures would be implemented either to avoid further resource impacts or to mitigate their loss or disturbance. In compliance with the Native American Graves Protection and Repatriation Act of 1990, the NPS would also notify and consult concerned tribal representatives for the proper treatment of human remains, funerary and sacred objects should these be discovered during the course of the project.

## **Conclusion**

Undertakings proposed under this alternative would be anticipated to have no adverse effect on historic properties. The construction of boardwalks and other measures to keep visitors on designated trails would have moderate long-term benefits on the protection of historic features such as the stone

walls of the Patowmack Canal. However, further study would be required to determine whether efforts to stabilize the area between Overlooks 1 and 2 would also provide adequate protection of buried cultural remains in that area. Construction of elevated boardwalk spans across the canal would also better protect the resource and enhance its historic visual character.

### **Park Operations and Facilities**

Measures to better manage visitor use and discourage visitors from entering unsafe areas near the river would have moderate long-term benefits on park law enforcement and rescue operations. With visitor numbers likely to increase, the park would be in a better position to proactively prevent unsafe situations from occurring rather than merely having to respond to emergency situations with limited personnel. There would be no change in the way the park is currently zoned.

Because of the intent to make facility improvements sustainable and capable of withstanding flood events, maintenance staff would be required to remove and provide temporary storage for railings and other removable features that might otherwise be damaged or swept away. Maintenance staff would assume the additional tasks of maintaining the new overlook structures and boardwalk/loop trail. The long-term sustainability of the Fisherman's Eddy access remains unknown without further study.

### **Conclusion**

Park operations (particularly law enforcement and rescue) would receive long-term moderate benefits from facility improvements and measures intended to restrict visitor access in unsafe areas. Park maintenance staff would have additional responsibilities to remove/replace railings and other structural features during flood events. Maintenance responsibilities would also be greater than Alternative B with both the new boardwalk/loop trail and overlooks to maintain. However, the time and costs incurred would be expected to offset, or not substantially exceed, what the park presently expends to maintain the existing deteriorated facilities, while attempting to prevent and repair resource damage. Because the long-term sustainability of the Fisherman's Eddy access is undetermined, the impacts on park operations in this area cannot be fully determined at the present time.

## **Alternative C1 (preferred) - Improve Overlooks 1 and 2, and Construct Shade Tree-Jetty Loop Trail and Overlooks**

### **Visitor Use and Safety**

Rehabilitation of Overlooks 1 and 2 would have the same benefits for visitor use and safety as those described for Alternatives B and C. In addition, the construction of the proposed loop trail/boardwalk

and additional overlooks in the Shade Tree/Jetty area behind the visitor center would provide convenient and safe access for viewing the river in that location. In comparison with Alternative B, the expanded trail system and river viewing facilities would better disperse visitors and would assist the park in accommodating anticipated future visitation increases. All the overlooks would be sensitively designed with materials intended to blend with the natural environment.

Establishment of the trail/boardwalk loop and the new information/directional kiosks at the trailheads would improve the visitor experience. The loop would be well-integrated with the park's existing circulation system. Kiosks would direct and orient visitors, and provide information on safety and resource protection. The loop and overlook areas would be accessible for disabled individuals, allowing them greater opportunities to view the falls.

Safety in the area behind the visitor center would be greatly improved by managing access in that area and providing increased visitor education about river hazards. The new overlooks in the Shade Tree/Jetty area would be in safe viewing locations, and new signs and railings would encourage visitors to remain on the loop and overlooks rather than venturing off into hazardous areas along the rocks. Additional signs and displays along the loop trail would also improve interpretation and impart requirements for protecting park resources.

Unlike Alternatives B and C, design measures to improve the access to Fisherman's Eddy would not be undertaken. Kayakers, rafters and anglers would continue to access the river at Fisherman's Eddy by means of the existing unimproved route until further studies are conducted.

## **Conclusion**

Improvements to the existing overlooks, and construction of a loop trail/boardwalk with additional overlooks in the Shade Tree/Jetty area, would have long-term moderate benefits on visitor use and safety. The visitor experience would be enhanced with the construction of more aesthetically compatible facilities, educational signs/kiosks, and other measures to improve visitor safety and resource protection. The expansion of trails and overlooks would better disperse visitors and relieve crowding.

## **Natural Resources**

Control of trail use and visitor access would help protect and manage natural resources in the area of the park near the visitor center. Although about 150 individuals of the species *Solidago simplex* var. *racemosa* would be impacted by the proposed construction of the loop trail, thousands of these plants

occur on the rocks along the river throughout the park. Park Natural Resource Management staff would monitor *Solidago simplex* var. *racemosa* populations in coordination with the Virginia Natural Heritage Program to measure this impact. By better managing visitor access and traffic, social trails to the north of the proposed loop would be minimized which would also assist in protecting populations of other rare plants (*Baptisia australis*, *Eleocharis elliptica*, and *Spartina pectinata*).

As in Alternatives B and C, coordination with the U.S. Fish and Wildlife Service and the states of Virginia and Maryland would continue regarding bald eagles nesting on Conn Island upstream of the falls, and other rare species. Project construction specifications would include any necessary limitations on when construction could occur so as to avoid disturbing sensitive nesting or breeding periods. Additional endangered species consultation would be required with the appropriate Virginia and Maryland resource protection agencies.

The existing conditions of the shore area between Overlooks 1 & 2 would persist until further studies are conducted to identify effective erosion control and resource protection measures.

## **Conclusion**

Minor short-term adverse effects to the rare plant species *Solidago simplex* var. *racemosa* would be anticipated from trail construction. Park staff would undertake appropriate monitoring. However, in the long-term, moderate benefits would occur to the park's flora (including other rare and uncommon plant species) by implementing measures intended to discourage visitors from venturing into restricted areas or departing the designated trail system.

The NPS would consult with federal and state agencies regarding appropriate mitigation and/or permit requirements for threatened plant and wildlife species. Short-term negligible adverse impacts on water resources would be anticipated. The park would continue to provide educational outreach to inform visitors of the importance of not disturbing sensitive natural resources.

## **Cultural Resources**

In common with Alternatives B and C, proposed project undertakings are anticipated to have no adverse effect on significant historic properties. Measures to keep visitors on designated trails would substantially reduce the potential for stone walls or other features to be destabilized by visitors walking on top of these resources. The existing conditions of the shore area between Overlooks 1 & 2 would persist until further studies are conducted to identify effective erosion control and cultural resource protection measures.



The loop trail would provide access to the George Washington memorial plaque that is found in the woods near the falls. Managing visitor access in that area would also enhance protection of the nearby gristmill site. Establishment of the loop trail would require two crossings of the historic Patowmack Canal near the visitor center. These crossings would consist of elevated boardwalk bridges anchored to abutments on either side of the canal that would avoid impacting the stone walls (no support piers would be constructed within the canal prism). The replacement of the existing fill crossing with these boardwalk spans would visually enhance the canal's historic character.

Project undertakings would be reviewed in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended. The NPS would notify and consult with the Virginia State Historic Preservation Officer and the Advisory Council on Historic Preservation as necessary. The NPS would carry out data recovery excavations if significant archeological resources were identified that could not be avoided by project redesign. Should presently unidentified archeological resources be discovered during construction, work in that location would stop until the resources are properly recorded by the NPS archeologist and evaluated under the eligibility criteria of the National Register of Historic Places. If (in consultation with the State Historic Preservation Office) the resources were determined eligible, appropriate measures would be implemented either to avoid further resource impacts or to mitigate their loss or disturbance. In compliance with the Native American Graves Protection and Repatriation Act of 1990, the NPS would also notify and consult concerned tribal representatives for the proper treatment of human remains, funerary and sacred objects should these be discovered during the course of the project.

## **Conclusion**

Undertakings proposed under this alternative would be anticipated to have no adverse effect on historic properties. The construction of boardwalks and other measures to keep visitors on designated trails would have moderate long-term benefits on the protection of historic features such as the stone walls of the Patowmack Canal. Buried cultural remains in the area between Overlooks 1 and 2 would remain at minor risk of erosion impacts until future studies and effective stabilization measures are carried out for the area. Construction of elevated boardwalk spans across the canal would also better protect the resource and enhance its historic visual character.

## **Park Operations and Facilities**

Measures to better manage visitor use and discourage visitors from entering unsafe areas near the river would have long-term moderate benefits on park law enforcement and rescue operations. With visitor numbers likely to increase, the park would be in a better position to proactively prevent unsafe

situations from occurring rather than merely having to respond to emergency situations with limited personnel. There would be no change in the way the park is currently zoned.

Because of the intent to make facility improvements sustainable and capable of withstanding flood events, maintenance staff would be required to remove and provide temporary storage for railings and other removable features that might otherwise be damaged or swept away. Maintenance staff would assume the additional tasks of maintaining the new overlook structures and boardwalk/loop trail.

## **Conclusion**

Park operations (particularly law enforcement and rescue) would receive long-term moderate benefits from facility improvements and measures intended to restrict visitor access in unsafe areas. Park maintenance staff would have additional responsibilities to remove/replace railings and other structural features during flood events. Maintenance responsibilities would also be greater than Alternative B with both the new boardwalk/loop trail and overlooks to maintain. However, the time and costs incurred would be expected to offset, or not substantially exceed, what the park presently expends to maintain the existing deteriorated facilities, while attempting to prevent and repair resource damage.

## **Cumulative Impacts**

The Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The NPS does not anticipate any significant cumulative adverse impacts related to the proposed project actions. Besides the improvements proposed under the preferred alternative, there are no foreseeable plans for additional overlooks or boardwalks at Great Falls Park that would further expand constructed facilities within the natural environmental setting. The Great Falls Management Plan will consider complimentary trails in this area. The visual improvements of the Potomac River shore in this area would complement other sensitively designed overlooks and boardwalks completed across the river on Olmsted Island, a part of the C & O Canal National Historical Park.

Although minor short-term, construction-related adverse impacts would occur to the rare plant

*Solidago simplex* var. *racemosa*, long-term benefits would be expected for protecting the species and other rare plants by better managing visitor use. Trail improvements would also help protect the Patowmack Canal and other historic properties, furthering the park's comprehensive objectives for cultural resource preservation. The proposed overlooks and boardwalk/loop trail would also contribute to long-term cumulative benefits on visitor use and safety, assisting the park's public outreach, patrol, and other efforts to deter visitors from entering unsafe areas along the river.

### **Environmentally Preferable Alternative**

The environmentally preferable alternative is the alternative that would promote the national environmental policy as expressed in the National Environmental Policy Act's Section 101. Generally this means the alternative that causes the least damage to the biological and physical environment. It also means the alternative that best protects, preserves, and enhances historic, cultural, and natural resources.

As considered in this environmental assessment, the preferred alternative (C1) is the environmentally preferable alternative. After review of potential resource and visitor impacts, and with consideration that appropriate mitigation measures would be carried out as necessary, the preferred alternative achieves the greatest balance between providing safe and enjoyable visitor experiences, with long-term preservation and protection of natural and cultural resources. Although Alternative C1 would defer improvements in the Fisherman's Eddy access area, it recognizes that further investigations are necessary to adequately inform management decisions regarding feasibility, long-term sustainability, and resource protection objectives in this area.

### **Finding of No Impairment of Park Resources or Values**

In addition to determining the environmental consequences of the preferred and other alternatives, NPS policy (Management Policies, 2001) requires analysis of potential effects to determine whether or not actions would impair park resources. National Park Service managers must seek ways to avoid or minimize to the greatest degree practicable, adverse impacts on park resources and values. However, NPS managers are granted discretionary authority to permit some impacts when necessary and appropriate to fulfill the purposes of the park, provided the impact does not constitute "impairment" of the affected resources and values. Impairment can result from impacts that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Impairment may result from actions undertaken by the NPS, park visitors, concessionaires, contractors, and/or others operating in the park. An impact to any park resource or

value may constitute an impairment to the extent it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

The impacts discussed for each of the alternatives would not constitute impairment because: none of the impacts would prevent the park from fulfilling specific purposes identified in the park's establishing legislation; none of the impacts would compromise the park's natural or cultural resource integrity, or prevent opportunities for enjoyment of the park; and none of the impacts would prevent the attainment of a goal identified in the park's management plan.

**Table 3. Summary of Environmental Consequences**

<b>Impact Topics</b>	<b>Alt. A (No Action)</b>	<b>Alt. B (Improve Overlooks 1 &amp; 2, &amp; Fisherman's Eddy Access)</b>	<b>Alt. C (Improve Overlooks 1 &amp; 2, Fisherman's Eddy Access, &amp; Construct Shade Tree/Jetty Loop Trail &amp; Overlooks)</b>	<b>Alt. C1 (Improve Overlooks 1 &amp; 2 &amp; Construct Shade Tree/Jetty Loop Trail &amp; Overlooks)</b>
<b>Visitor Use &amp; Safety</b>	A broad range of recreational opportunities would be retained, but visitors would likely continue to be at risk of injury by straying from designated trails. Social trail traffic would continue to degrade sensitive resources.	Long-term minor to moderate benefits on visitor use and safety would occur from upgrades of existing overlooks and the designated river access area. New facilities would be aesthetically compatible with surroundings and accessible. Access would be closed in the Shade Tree/Jetty area to protect visitors. Visitor crowding may occur at overlooks and access trails. Visitor safety at the Fisherman's Eddy access is undetermined until further study.	Same as Alt. B. Additional construction of a loop trail/boardwalk and overlooks in the Shade Tree/Jetty area would improve visitor safety in that area and protect resources. Visitors would be dispersed over a wider trail/overlook system and crowding would be reduced compared with Alt. B.	Same as Alts. B and C. Additional construction of a loop trail/boardwalk and overlooks in the Shade Tree/Jetty area would improve visitor safety in that area and protect resources. Visitors would be dispersed over a wider trail/overlook system and crowding would be reduced compared with Alt. B. Visitors would continue to access Fisherman's Eddy over the present unimproved route.

<b>Impact Topics</b>	<b>Alt. A (No Action)</b>	<b>Alt. B (Improve Overlooks 1 &amp; 2, &amp; Fisherman's Eddy Access)</b>	<b>Alt. C (Improve Overlooks 1 &amp; 2, Fisherman's Eddy Access, &amp; Construct Shade Tree/Jetty Loop Trail &amp; Overlooks)</b>	<b>Alt. C1 (Improve Overlooks 1 &amp; 2 &amp; Construct Shade Tree/Jetty Loop Trail &amp; Overlooks)</b>
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<b>Natural Resources</b>	<p>Long-term moderate adverse impacts to park flora (including rare and uncommon plant species) may result from continuation of current management policies. Negligible to minor adverse impacts on wildlife and water resources would also likely continue.</p>	<p>Long-term minor to moderate benefits would occur to park flora (including rare and uncommon plant species) by measures discouraging visitors from entering restricted areas or departing the designated trail system. Further study is required to determine if shore stabilization would prevent erosion in the Fisherman's Eddy area. Construction may cause short-term negligible adverse impacts on water quality. The NPS would continue to consult with state and federal wildlife officials to ensure that construction is scheduled to minimize disturbance of sensitive wildlife species.</p>	<p>Same as Alt. B. Short-term minor adverse impacts would occur to the rare plant (<i>Solidago simplex</i> var. <i>racemosa</i>) as a result of construction activities. However, this species and other rare and uncommon plants would receive long-term moderate benefits by better managing visitor use along a designated trail/overlook system in the Shade Tree/Jetty area.</p>	<p>Same as Alts. B and C. Short-term minor adverse impacts would occur to the rare plant (<i>Solidago simplex</i> var. <i>racemosa</i>) as a result of construction activities. However, this species and other rare and uncommon plants would receive long-term moderate benefits by better managing visitor use along a designated trail/overlook system in the Shade Tree/Jetty area.</p>
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Impact Topics	Alt. A (No Action)	Alt. B (Improve Overlooks 1 & 2, & Fisherman's Eddy Access)	Alt. C (Improve Overlooks 1 & 2, Fisherman's Eddy Access, & Construct Shade Tree/Jetty Loop Trail & Overlooks)	Alt. C1 (Improve Overlooks 1 & 2 & Construct Shade Tree/Jetty Loop Trail & Overlooks)
<b>Cultural Resources</b>	Stone walls of the Patowmack Canal and other historic resources may continue to be adversely impacted by visitors inadvertently walking on the walls, loosening and destabilizing the stonework. The park would continue to undertake preservation activities to repair and stabilize deteriorated canal walls and other features.	If successful, project undertakings would have no adverse effect on historic properties. Archeological surveys would be carried out of project areas to ensure that significant archeological resources (if identified) are avoided or appropriately mitigated prior to construction. Any stabilization measures proposed for the area between Overlooks 1 and 2 would require protection of buried cultural features.	Same as Alt. B. Project undertakings would have no adverse effect on historic properties, and would help prevent the destabilization and erosion of canal stonework and other historic features. Archeological surveys would be carried out of project areas. Construction of elevated boardwalk spans across the Patowmack Canal would also better protect the resource and improve its historic character. Any stabilization measures proposed for the area between Overlooks 1 and 2 would require protection of buried cultural features.	Same as Alts. B and C. Project undertakings would have no adverse effect on historic properties, and would help prevent the destabilization and erosion of canal stonework and other historic features. Archeological surveys would be carried out of project areas. Construction of elevated boardwalk spans across the Patowmack Canal would also better protect the resource and improve its historic character. Buried cultural remains in the area between Overlooks 1 and 2 would remain at minor risk of erosion impacts until future studies and effective stabilization measures are carried out for the area.



Impact Topics	Alt. A (No Action)	Alt. B (Improve Overlooks 1 & 2, & Fisherman's Eddy Access)	Alt. C (Improve Overlooks 1 & 2, Fisherman's Eddy Access, & Construct Shade Tree/Jetty Loop Trail & Overlooks)	Alt. C1 (Improve Overlooks 1 & 2 & Construct Shade Tree/Jetty Loop Trail & Overlooks)
<b>Park Operations and Facilities</b>	Park overlooks and trails would receive routine maintenance as feasible. However, these would likely continue to deteriorate, presenting safety/accessibility problems and visual incompatibility with the surrounding landscape. Park law enforcement and rescue operations would continue to react to high levels of visitor emergency situations.	Park law enforcement and rescue operations would receive long-term moderate benefits from facility improvements and measures intended to restrict visitor access in unsafe areas. Park maintenance staff would have additional responsibilities to remove and replace railings and other structural features of the overlooks and access trails during flood events. If not properly engineered, Fisherman's Eddy access could require repeated reconstruction; sustainability is unknown.	Same as Alt. B. Park law enforcement and rescue operations would receive long-term moderate benefits from facility improvements and measures to restrict visitor access in unsafe areas. Additional maintenance responsibilities would accompany the construction of the boardwalk/loop trail system and additional overlooks in the Shade Tree/Jetty area.	Same as Alts. B and C. Park law enforcement and rescue operations would receive long-term moderate benefits from facility improvements and measures to restrict visitor access in unsafe areas. Additional maintenance responsibilities would accompany the construction of the boardwalk/loop trail system and additional overlooks in the Shade Tree/Jetty area.

## **CONSULTATION AND COORDINATION**

### **Agencies Consulted**

U.S. Fish and Wildlife Service  
 Virginia Natural Heritage Program  
 Virginia State Historic Preservation Officer, Virginia Department of Historic Resources  
 Advisory Council on Historic Preservation  
 U.S. Army Corps of Engineers, Norfolk District  
 Maryland State Historic Preservation Officer, Maryland Historic Trust

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